

The Economic Impact of
Northeastern Ohio Universities
Colleges of Medicine and Pharmacy
and Affiliated Teaching Hospitals
2008

Executive Report

September 23, 2008

Introduction

Northeastern Ohio Universities Colleges of Medicine and Pharmacy (NEOUCOM), with Ohio's six other medical schools retained the services of Tripp Umbach to measure the 2007 impact of NEOUCOM and its core and non-core affiliated teaching hospitals on the State of Ohio.¹ This report presents the economic impact that NEOUCOM has on the State of Ohio.

Specifically, this report will review the overall impacts generated by NEOUCOM and its teaching affiliates:

- Quantifies the economic impact of NEOUCOM's "academic health care industry" specifically the total economic impact of Northeastern Ohio Universities Colleges of Medicine and Pharmacy's academic medical centers, core affiliates and non-core teaching affiliates in Ohio.
- Quantifies the economic impact of NEOUCOM's "college of medicine and core affiliates," on the State of Ohio.
- Measures the direct and indirect employment impact generated in Ohio as a result of NEOUCOM and its teaching affiliates.
- Measures government revenues that are generated by the presence and operations of NEOUCOM and its teaching affiliates.

¹ This study includes "core" or major affiliated teaching hospitals in the overall impact of the academic health centers. Major affiliate teaching hospitals are defined as institutions that are an important part of the teaching program of one of these academic health centers and a major unit in the school's clinical clerkship program. Major teaching institutions provide clerkship experience in two or more of the major services (e.g., internal medicine and obstetrics/gynecology). Non-core affiliates include any hospital that houses a residency program of a medical college and/or regularly rotates students with limited affiliation.

Northeastern Ohio Universities Colleges of Medicine and Pharmacy

Core Teaching Hospitals	Non-Core Teaching Hospitals
● Akron Children's Hospital	● Edwin Shaw Hospital for Rehabilitation, Akron
● Akron General Medical Center	● Forum Health Hillside Rehabilitation Hospital, Warren
● Aultman Hospital, Canton	● Forum Health Trumbull Memorial Hospital, Warren
● Barberton Citizens Hospital	● Heartland Behavioral Healthcare, Massillon
● Forum Health/Western Reserve Care System, Youngstown	● MedCentral Health System, Mansfield
● Mercy Medical Center, Canton	● Medina General Hospital, Medina
● Saint Elizabeth Health Center, Youngstown	● Robinson Memorial Hospital, Ravenna
● Summa Health System, Akron	● Salem Community Hospital, Salem
	● Wadsworth-Rittman Hospital, Wadsworth

Academic health care is a driving force in the overall US health care economy. Current estimates show that the nation now spends more than \$2.0 trillion annually on health care. While there are more than 5,000 hospitals in the United States, there are just 129 academic medical colleges. However, it is these medical colleges and their affiliated teaching hospitals, as part of the broader academic health center organizational structure that impacts a substantial part of our current health care economy. According to the Association of American Medical Colleges national study, academic health centers accounted for more than \$450 billion in 2005, nearly one quarter of the entire US health care industry.²

² Tripp Umbach, Economic Impact of Medical Schools, Association of American Medical Colleges, 2005.

Study Highlights

During 2007, the economic impact of NEOUCOM and its affiliated academic health care industry on the State of Ohio equaled \$5.5 billion. Further, NEOUCOM and its core and non-core teaching hospital affiliates accounted for over 61,000 Ohio full time equivalent positions and \$166.5 million in total state tax revenue.

\$5.5 billion economic impact on Ohio

61,455 full time equivalent jobs

\$166.5 million in total state tax revenue

The 2007 Impacts of Northeastern Ohio Universities Colleges of Medicine and Pharmacy and its Teaching Affiliates on the State of Ohio

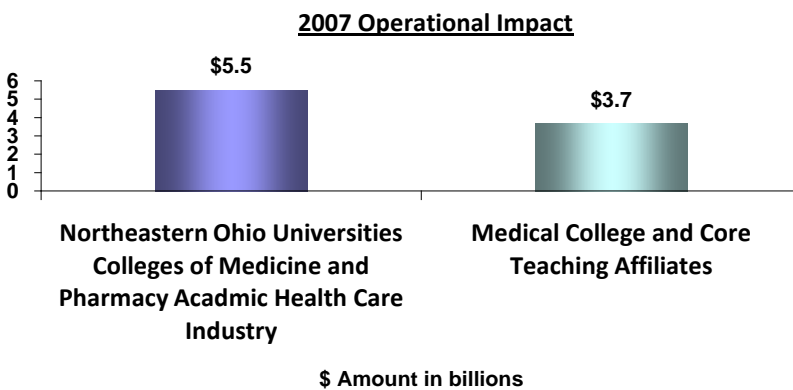
Although this report focuses on the economic impact of NEOUCOM and its affiliated hospitals on the State of Ohio, the medical school and its affiliates have substantial economic and social impacts to Northeastern Ohio. Communities in all regions of Ohio rely on academic health centers for direct job creation and attraction of new out-of-state and international investment. NEOUCOM is certainly an important economic engine in Northeastern Ohio. Beyond strictly economic benefits, medical schools train physicians who are likely to locate their practices locally and provide significant levels of community outreach and volunteer services to the underserved.

Northeastern Ohio Universities Colleges of Medicine and Pharmacy's Role in the State's Economy

NEOUCOM is part of an impressive statewide concentration of academic health centers. In 2007, the seven medical schools and 105 affiliated teaching hospitals in Ohio had a combined economic impact on the State of Ohio of \$37.2 billion. Ohio's medical education industry is a significant generator of economic expansion in the nation. Although Ohio has only 4% of all U.S. residents it accounts for more than 6% of the U.S. academic health industry.

Compelling forces acting upon the future of academic medicine and specialized care drives the performance of this research; specifically reductions in funding at the federal and state level for medical education and patient care. The changing structure of healthcare delivery at the national and state levels poses a substantial threat to the future economic viability of NEOUCOM and Ohio's other academic health centers and its continued national and international preeminence in clinical treatment, research and education.

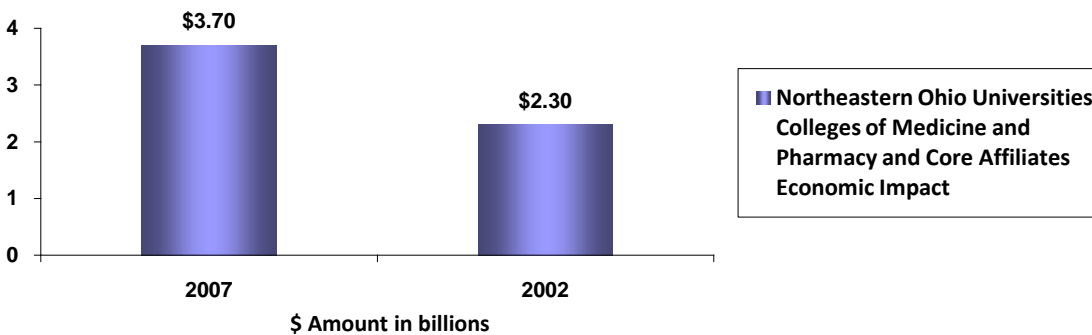
The combined economic impact of NEOUCOM's total academic health care industry, the medical college and all of the core and non-core teaching hospitals equaled \$5.5 billion in 2007. The operation of Northeastern Ohio Universities Colleges of Medicine and Pharmacy and its core teaching hospital affiliates totaled more than \$3.7 billion.³



³ Medical Colleges and their Core Teaching Affiliates include institutions that generally provide clerkship experience in two or more of the major services: internal medicine, surgery, pediatrics and obstetrics-gynecology. An institution responsible for most of the teaching in a single specialty, such as psychiatry or pediatrics, may also be considered a major affiliation. In a major teaching institution, medical students serve clinical clerkships regularly on inpatient services, under the supervision of medical school faculty. A major teaching institution may or may not be used for medical school residencies.

Generation of Economic Expansion, Government Revenue and Employment

The economic impact of NEOUCOM and the core teaching affiliates equaled \$3.7 billion in 2007. This represents an increase of nearly \$1.4 billion dollars since 2002. Five years ago, the economic impact of NEOUCOM and its eight major teaching affiliates had a combined economic impact in of \$2.3 billion, and accounted for more than 30,000 Ohio FTE jobs⁴. This significant growth is attributed to increased investment by NEOUCOM and its partner affiliates towards medical education over the past five years. This investment will continue as NEOUCOM and its partners remain major contributors to Ohio's economy. In 2007, over 41,000 FTE jobs were directly and indirectly attributed to the operations of NEOUCOM and its core affiliated teaching hospitals. Businesses operating within the State of Ohio in the wholesale, retail, service and manufacturing sectors benefit from the direct expenditures of NEOUCOM and its staff on goods and services. In addition, Ohio businesses also benefit from spending generated by hospital patients, patients' visitors, and the spending of medical students and their visitors. Additionally, these "direct" expenditures are re-circulated in the economy as recipients of the first-round of income re-spend a portion of this income with other businesses and individuals within the state. This re-spending is often termed the "multiplier" or "indirect" effect.



Spending money in and of itself, however, is not sufficient for an institution to be considered a significant economic engine. What is required for a true expansion of the economic base is the spending in the state of dollars attracted from outside of the state. By bringing in funds from outside the state, NEOUCOM is a substantial source of a net expansion in the state economy.

⁴ In the 2002 study, the major teaching affiliates included Akron General Medical Center, Barberton Citizens Hospital, Humility of Mary Health Partners, Summa Health System, Aultman Hospital, Children's Hospital, Mercy Medical Center, and Western Reserve Forum

The out-of-state medical center revenue sources identified include:

- Payments for services provided to patients who do not reside in Ohio.
- Tuition, room and board, and all other payments made to the institution by medical students from out-of-state and students involved in other healthcare programs (e.g., nursing) from out-of-state.
- Research funding received by the institution from out-of-state sources (e.g., NIH, private industry, etc.)
- Endowments, contributions and gifts from out-of-state sources.

In addition, Ohio's economy benefits from other funds not included in NEOUCOM's budget, but are attributable to its presence. These funds include:

- Spending in the state, outside of the medical center, by out-of-state students.
- Spending in the state, outside of the medical center, by out-of-state patients and visitors.
- Spending by out-of-state attendees attending medical center-sponsored conferences, seminars and symposiums.

NEOUCOM and its affiliated teaching hospitals serve as a major regional employer, providing quality sustainable employment to a diverse group of workers. Dramatic levels of economic expansion created by NEOUCOM and its affiliates create demand for additional employment in the state's economy. As presented in Appendix B and Appendix C, the "employment-multiplier" related to the economic impact of NEOUCOM and its affiliates is responsible for thousands of additional Ohio jobs. In 2007 alone, over 61,000 jobs in Ohio were directly or indirectly related to the operations of NEOUCOM and its associated academic health care industry.

Uncompensated Care

While the economic impacts of institutional expenditures and job creation in the state are substantial, so too are the contributions made to the care of the uninsured. Uncompensated care is a major financial burden for academic health centers such as NEOUCOM. Although academic health centers comprise less than 6% of the nation's acute care hospitals, estimates show they provide 50% of uncompensated care in the United States.⁵

Uncompensated care at NEOUCOM's affiliated teaching hospitals takes the form of care provided to the uninsured, forgiveness of bad debt, and Medicare and Medicaid shortfalls. Tripp Umbach estimates that total uncompensated care provided by NEOUCOM's affiliate teaching hospitals equaled more than \$231.9 million in 2007.

Research, Medical Innovation & Related Business Spin-Offs

Although research and business spin-off activities are not a primary focus of this study, research and medical innovation provides multiple benefits beyond pure economics and employment. Research undertaken at NEOUCOM and other academic health centers throughout the United States is widely considered to be responsible for the preponderance of major advances in medical knowledge. Research at academic health centers is fundamental to the future health status of Ohio residents.

The economic impacts of research go beyond the prevention of future disease-related costs. Research at academic health centers has a substantial and measurable effect on business formation and economic development. Surveys of research managers, conducted as early as 1985, found that university-based research is an important source of innovation for industry, especially for those industries in the biological sciences.⁶ Research performed at the Harvard University Department of Economics has confirmed the relevance and importance of academic health centers and general university-based research in the generation of spin-off businesses.⁷ The Harvard research, performed by Adam Jaffe, concluded, "university research causes industry R&D and not vice versa. Thus, a state that improves its university research system will increase local innovation both by attracting industrial R&D and augmenting its productivity." The findings were particularly strong in spin-off effects for the drug industry, and the researchers concluded that the spin-off effects "appear to be large." In fact, a wide spectrum of research since the 1980s indicates that the strength of the university-to-business spin-off relationship is even stronger than Jaffe originally reported, and geographic proximity to the university or academic health center performing the research is an important driver of the location of these business spin-offs.

⁵ Cohen, Jordan J., "Why is Academic Medicine Dying for Universal Coverage?," *American Medical News*, August 16, 1994.

⁶ Nelson, Richard R., "Institutions Supporting Technical Advance in Industry," *American Economic Review*, May 1986, pp. 186-189.

⁷ Jaffe, Adam B., "Real Effects of Academic Research," *American Economic Review*, December 1989, pp. 957-970.

These and other path-breaking research projects have proven the strong and measurable impacts that academic health centers have on new business ventures and the commercialization of innovations in the states in which these institutions are located. Northeastern Ohio's biotechnology, medical technology and biomedical companies have undoubtedly benefited from research conducted at NEOUCOM.

Education of Medical Professionals

The U.S. healthcare system, with its model of medical education led by a faculty deeply involved in research and clinical practice, has created a national resource of healthcare practitioners with skills and training that can truly be called the best in the world. Medical professionals trained at NEOUCOM have the opportunity to learn from some of the nation's most renowned surgeons and medical researchers. This depth of teaching excellence has a real effect on the caliber of medical students attracted to train in the state, and the physicians and other healthcare professionals who graduate from NEOUCOM who are ready to serve the people of Ohio.

Medical education resources at NEOUCOM also have a significant economic impact on the state. The quality of healthcare resources available enhances workforce productivity and the quality-of-life of state residents. In addition, education is well documented in providing a present value of future earnings impact for education recipients. Increased earning power of Ohio-trained healthcare professionals provides a return in terms of increased tax revenues to state and local government, and increased income for other in-state recipients of healthcare professionals spending of disposable income.

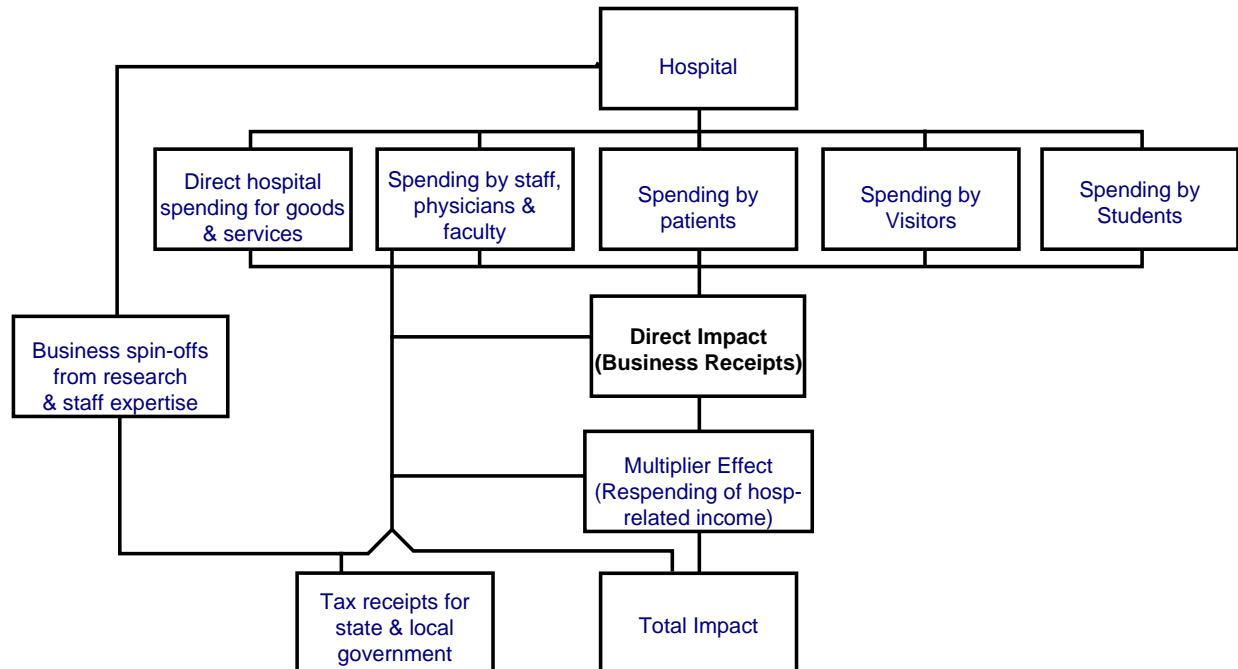
Appendix A: Methodology Employed in the Economic Impact Study

Tripp Umbach has performed more than 150 economic impact studies for both academic institutions and large health care systems, including for the Mayo Clinic Rochester, UPMC Health System, and North Mississippi Health System. The methodology generally employed in these studies was originally derived from a set of research tools and techniques developed for the American Council on Education (ACE).⁸ The ACE-based methodology employs linear cash flow modeling to track the flow of institution-originated funds through a delineated spatial area. While this methodology is generally well suited to evaluate a hospital's impact on its local service area, it tends to be too limiting for a project with the complexity of a medical colleges with an integrated systems.

Based on previous economic impact studies performed for academic health centers in Ohio, Pennsylvania and Virginia, Tripp Umbach recommended that the traditional model of economic impact for hospitals (see Figure 1), based on the ACE model, be modified for the purposes of this research.

Figure 1

**Hospital Economic Impact
(A Traditional Model)**

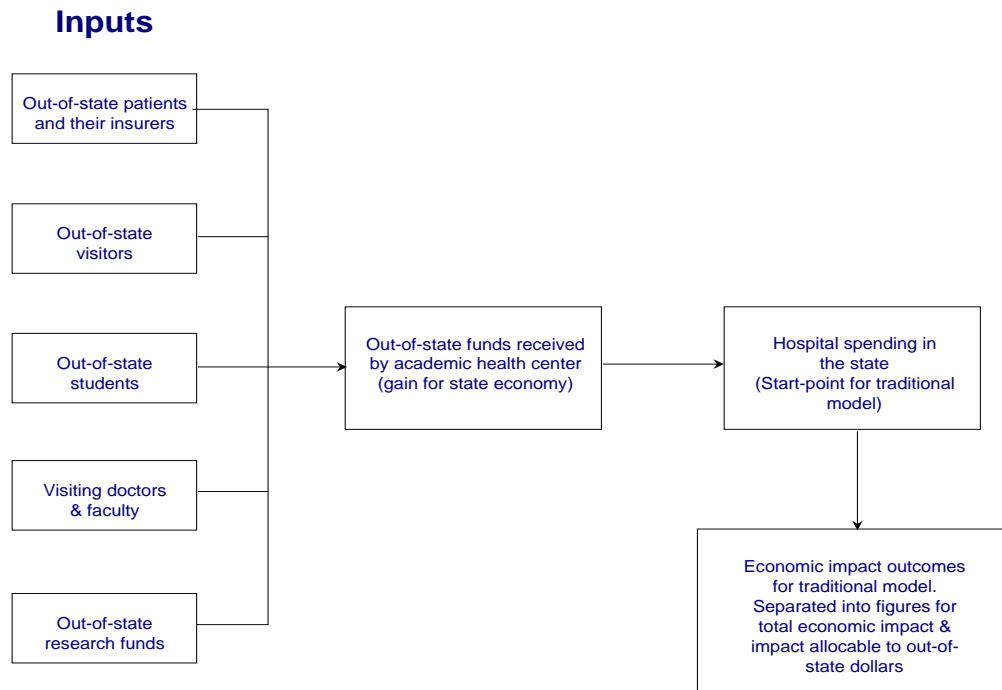


⁸ Caffrey, John and Isaacs, Herbert, "Estimating the Impact of a College or University on the Local Economy," American Council on Education, 1971.

The "traditional" model of hospital economic impact provides a good measure of the impact of hospital expenditures and their flow within an economy. However, the model does not account for the origination of hospital revenues, and thus counts the spending of revenues received by the hospital from in-state sources. The traditional model counts some of the spending of dollars that already existed in the Ohio economy.

The Tripp Umbach research team felt it important to distinguish the economic impact of the institutions that are attributable to funds brought into the state from out-of-state sources. The application of this "fresh dollar" model provides a first-line measure of the initial direct expansion in the state economy caused by the academic health centers. The final model concept evolved into a hybrid model including a fresh-dollar approach feeding into a traditional model which tracks hospital in-state spending. Thus the final model used for this research (see *Figure 2*) measures funds brought into the state together with the ultimate flow of these funds through the Ohio economy and the effect on economic expansion, job growth and enterprise development. The final methodology closely matches the impact study methodology recommended for individual medical schools by the Association of American Medical Colleges.

Figure 2
Ohio Academic Health Centers
Economic Impact Model



Tripp Umbach researchers worked closely with representatives from Northeastern Ohio Universities Colleges of Medicine and Pharmacy and its hospital affiliates to collect the data required for the analysis. The following data were required to perform this research:

1. Northeastern Ohio Universities Colleges of Medicine and Pharmacy Data

Northeastern Ohio Universities Colleges of Medicine and Pharmacy supplied specific data at the request of the Tripp Umbach team. Data supplied by NEOUCOM included, but was not limited to:

- receipts from out-of-state patients
- numbers of visiting doctors and faculty
- research funding levels and sources of funds
- number of students from out-of-state
- in-state alumni retention
- geographic distribution of hospital spending (in-state vs. out-of-state)

2. Tripp Umbach Impact Study Data

Tripp Umbach supplied additional information as required to supplement the data supplied by NEOUCOM and the other Ohio-based medical schools. Tripp Umbach used secondary research and its company's national databases to generate business volume and employment statistics at the state level, visitor spending, employee and physician spending patterns, and government revenue. Tripp Umbach also developed appropriate business and employment multipliers.

Appendix B. Detailed Breakdown of Economic, Employment, and Government Revenue Impacts for NEOUCOM's Total Academic Health Industry

Business Volume Impact

The Direct and Indirect Expansion of the State Economy Attributable to NEOUCOM and Core and Non-Core Teaching Affiliates

Direct economic impact stems from the spending of NEOUCOM and all of their core and non-core teaching hospitals and affiliates, known as the academic health industry. These impacts fall within seven principal groups: institutional expenditures for capital improvements, goods and services; the spending of employees; spending of independent contractor physicians; spending of medical residents; spending of medical and other health sciences students; the spending of patients (external to the hospital, such as expenditures for medication); and the spending of visitors. In addition these direct, first-round expenditures, received as income by businesses and individuals in the state, re-circulate through the economy in successive rounds of re-spending. The end result is a multiplied economic impact that is a linear result of the academic health centers' presence and their spending patterns.

The results of this analysis include:

Total Business Volume Impact

In 2007 NEOUCOM's affiliated academic health industry, the medical college and all core and non-core teaching hospital affiliates in Ohio had a combined total economic impact on the state of \$5.5 billion.

This economic impact comprised of \$2.4 billion in direct business volume impact and a further \$3.1 billion in indirect economic impacts accruing to the economy through the multiplier.

The direct impact was comprised of the following impact components:

a. Direct spending for capital improvements, goods, supplies and services

This category of impact includes the spending by NEOUCOM's academic health industry (medical school, core and non-core teaching affiliates) for improvements to their facilities and capital equipment purchases made with Ohio contractors and vendors (an average of spending over the previous five years was used). In addition the category also includes the purchase, from in-state vendors, of goods, services and supplies. These may include a broad range of purchases such as laundry services, food and beverage supplies, drugs, medical disposables, computer consulting, etc.

In 2007 this spending contributed \$1.6 billion to the direct academic health industry business volume impact.

b. Direct spending by staff

While NEOUCOM's academic health industry spends substantial money in the state on goods and services, one of their biggest benefits to the economy is their direct payroll. The medical college and its affiliated academic health industry have a combined payroll and benefits obligation to staff (administrators, nurses, aides, etc.) of over \$467.9 million, the majority of which goes to Ohio residents, who spend the vast majority of their disposable income in the state.

c. Direct spending by employed physicians

As with payroll to general staff, the pay provided to physicians directly employed by the academic health centers has a substantial positive impact on the economy. Adjusting for payroll to staff residing out-of-state, savings and taxes, the total physician payroll generates \$33.7 million in direct impact through employed physician spending in the state.

d. Direct spending by residents, medical and health sciences students

As institutions of excellence in research, medical and health sciences education, Ohio's academic health centers attract students from outside Ohio and the United States to study at NEOUCOM. It is only these out-of-state students whose impact is counted in this impact study, since it is they that bring with them a fresh influx of dollars to the Ohio economy. It is important to note, on average over 90% of NEOUCOM's medical students are citizens of Ohio.

The spending of the out-of-state residents and students for housing, food, supplies, entertainment and other items and services comprises their direct impact on the Ohio economy. Only resident and spending that is made off-campus is included in the impact calculations. In 2007, out-of-state student spending amounted to \$26.7 million.

e. Direct spending, outside of the Medical School and Teaching Hospitals by patients from out-of-state

Spending by patients for medical services is not included in the direct impact. Only the spending of these patients in the state outside of the academic health centers is included. On this basis, out-of-state patient spending has an impact of \$67.9 million on Ohio business volume annually. As noted, actual out-of-state patient spending is substantially in excess of this, but is already accounted for in the above cited medical center spending.

f. Direct spending by out-of-state patient visitors

As any person working at a hospital could confirm, medical centers are substantial visitor destinations. Visitors come to see patients who are friends and family, and when they are from out-of-state, they bring with them spending in the Ohio economy for accommodations, gifts, services and other items during their stay. In 2007 out-of-state patient visitors generated \$69.9 million in the Ohio economy.

g. Direct spending by conference and meeting visitors

NEOUCOM and its affiliated academic health industry is a major sponsor of meetings, seminars and symposiums in the state. These events draw significant numbers of out-of-state delegates, who like delegates to other conferences and trade-shows in the state, provide a major boost to the economy through their fresh influx of dollars. In addition to the conference delegates, the hospital physicians, employees and students also attract substantial numbers of visitors from outside of the state. In 2007 visitors for meetings and conferences spent \$122.1 million. The total impact of spending by patient visitors and conference attendees in 2007 equals more than \$190 million.

Additional Business Impacts Allocable to the Medical College and Core and Non-Core Teaching Hospitals

In addition to the annual, recurring impacts of the spending categories outlined above, businesses in the state have invested heavily to support the business volume generated by the academic health centers. The Tripp Umbach impact model calculates the two principal components of business investments: business real property development and business inventories committed to academic health center-related business.

Ohio businesses have invested a total of \$811.4 million in real property developments to support their business with NEOUCOM and related populations. Business inventories in the state allocable to NEOUCOM and its affiliated teaching hospitals related business volume are calculated to be over \$679.8 million.

Impact on State Government Revenues

Revenues to the State of Ohio Allocable to NEOUCOM and Core and Non-Core Teaching Affiliates

A major misconception held by business leaders, elected officials, and the general public, is that medical colleges and teaching hospitals do not generate government revenue. While Ohio's academic health centers are not-for-profit institutions, the State of Ohio still receives substantial revenues as a result of both the direct and indirect influence of these medical centers. NEOUCOM and its affiliated teaching hospitals provided \$166.5 million dollars in state income taxes, \$13.7 million of which are paid directly to the state government and \$152.8 million are generated indirectly by the spending of NEOUCOM and their core and non-core affiliates. In addition, the substantial spending with Ohio business generates large-scale revenues for the state in the form of sales tax, corporate net income tax and capital stock/franchise taxes. The Tripp Umbach model calculated the revenue benefits accruing to the state from these sources.

The results of this analysis follow:

Total State Government Revenue

NEOUCOM and their core and non-core affiliates generated a total of \$166.5 million in revenues for the State of Ohio in 2007. The \$152.8 million in indirect revenues are comprised of the following:

- a. **Income taxes paid by Medical School and Teaching Hospital staff, employed physicians, independent contractor physicians and medical residents**

The state income tax payments of personnel employed by NEOUCOM and the independent contractor physicians among the affiliated teaching hospitals on the portion of their income attributable to NEOUCOM, generate \$65.4 million in revenue for the State of Ohio.

- b. **Sales Tax revenues received by the State of Ohio**

As noted above, NEOUCOM and its affiliates generate substantial sales for businesses in the state. This spending also generates sales and other consumption tax revenue in the state, which in the twelve-month period covered in the study amounts to \$54.8 million.

c. Corporate Net Income Tax received by the State of Ohio

The business volume generated by the academic health care industry and their related spending is received as revenue by a broad range of businesses in the state. This revenue, in the case of corporations, generates corporate net income tax receipts for the State of Ohio. During 2007, the business volume attributed to NEOUCOM and its affiliates generated nearly \$13 million in corporate net income tax for the state.

d. Other selective business taxes received by the State of Ohio

A number of other taxes apply to various business enterprises around the state, these include: gross receipts tax, public utility realty tax, insurance premiums tax, motor vehicle tax, and the financial institutions tax. The business volume generated by NEOUCOM and its affiliates and the many Ohio businesses they support generated approximately \$19.6 million in these other selective business taxes during the twelve-month period studied.

Impact on Employment

The Direct and Indirect Expansion of Employment in the State Attributable to NEOUCOM and its Core and Non-Core Teaching Affiliates

Perhaps the benefit that comes closest to home is the sheer number of Ohio's citizens who depend on these institutions, either directly or indirectly, for their jobs and livelihoods. A total of 61,455 FTEs in the State of Ohio in 2007 were directly and indirectly attributable to NEOUCOM's academic health industry.

Even on a direct employment basis (i.e., only counting those directly employed at the academic health centers) Ohio's academic health centers are responsible for a substantial component of statewide employment. During 2007, NEOUCOM and their affiliated teaching hospitals were directly responsible for employing more than 34,000 FTEs and indirectly supporting over 27,000 FTEs.

While direct employment is significant, the actual extent of employment impact on the state stemming from the academic health centers is considerably larger. The business volume generated by the academic health centers creates jobs in a broad range of sectors throughout the state's economy. These jobs are proportionate to the service needs of the academic health centers themselves and their related populations (staff, physicians, students, etc.). In addition, the tax revenues generated at the state and local levels by the academic health centers and their business volume also create government employment opportunities.

Appendix C. Detailed Breakdown of Economic, Employment, and Government Revenue Impacts for NEOUCOM's Core Academic Health Industry

With combined economic impact in 2007 of \$3.7 billion, NEOUCOM and its core teaching affiliates have a truly substantial economic impact on the state. NEOUCOM has a tremendous direct impact on the state, and the benefits of these initial expenditures ripple through the Ohio economy providing economic benefits, through the multiplier effect, to the majority of Ohio's citizens.

Business Volume Impact

The Direct and Indirect Expansion of the State Economy Attributable to NEOUCOM and its Core Teaching Affiliates

NEOUCOM's direct economic impact stems from the spending of seven principal groups: institutional expenditures for capital improvements, goods and services; the spending of employees; spending of independent contractor physicians; spending of medical residents; spending of medical and other health sciences students; the spending of patients (external to the hospital); and the spending of visitors. In addition these direct, first-round expenditures, received as income by businesses and individuals in the state, re-circulate through the economy in successive rounds of re-spending. The end result is a multiplied economic impact that is a linear result of the academic health centers' presence and their spending patterns.

The results of this analysis include:

Total Business Volume Impact

In 2007, NEOUCOM and its affiliates had a combined total economic impact on the State of Ohio of \$3.7 billion.

This economic impact comprised \$1.6 billion in direct business volume impact and a further \$2.1 billion in indirect economic impacts accruing to the economy through the multiplier.

The direct impact was comprised of the following impact components:

a. Direct spending for capital improvements, goods, supplies and services.

This category of impact includes the spending by the academic health centers for improvements to their facilities and capital equipment purchases made with Ohio contractors and vendors (an average of spending over the previous five years was used). In addition the category also includes the purchase, from in-state vendors, of goods, services and supplies. These may include a broad range

of purchases such as laundry services, food and beverage supplies, drugs, medical disposables, computer consulting, etc.

In 2007 this spending contributed \$1.1 billion to NEOUCOM's business volume impact.

b. Direct spending on staff.

While academic health centers such as NEOUCOM spend substantial money in the state on goods and services, one of their biggest benefits to the economy is their direct payroll. NEOUCOM and its affiliates have a combined payroll and benefits obligation to staff (administrators, nurses, aides, etc.) of \$320.1 million, the majority of which goes to Ohio residents, who spend the majority of their disposable income in the state.

c. Direct spending on employed physicians.

As with payroll to general staff, the pay provided to physicians directly employed by NEOUCOM's affiliated teaching hospitals has a substantial positive impact on the state economy. Physician payroll generates \$22.7 million in direct impact through employed physician spending in the state.

d. Direct spending on residents, medical and health sciences students.

The spending of the out-of-state residents and students for housing, food, supplies, entertainment and other items and services comprises their direct impact on the Ohio economy. Only resident and spending that is made off-campus is included in the impact calculations. In total, out-of-state student spending amounts to a \$22.2 million economic impact on the state economy.

e. Direct spending, outside of the academic health centers, by patients from out-of-state.

Patient's spending for medical services are not included in the direct impact. Only the spending of these patients in the state outside of the academic health centers is included. On this basis, out-of-state patient spending related to NEOUCOM's affiliated teaching hospitals had an impact of nearly \$45 million on Ohio business volume in 2007.

f. Direct spending by out-of-state patient visitors.

As any person working at a hospital can confirm, medical centers are substantial visitor destinations. These visitors come to see patients who are friends and family, and when they are from out-of-state they bring with them spending in the Ohio economy for accommodations, gifts, services and other items during their stay. In 2007 out-of-state patient visitors at NEOUCOM's affiliated teaching hospitals generated \$46.3 million in the Ohio economy.

g. Direct spending by conference and meeting visitors.

NEOUCOM is an important sponsor of meetings, seminars and symposiums in the state. These events draw significant numbers of out-of-state delegates, who like delegates to other conferences and trade-shows in the state, provide a major boost to the economy through their fresh influx of dollars. In addition to the conference delegates, the hospital physicians, employees and students also attract substantial numbers of visitors from outside of the state. In 2007 visitors for NEOUCOM and its affiliated teaching hospitals' sponsored meetings and conferences spent nearly \$84 million.

Additional Business Impacts Allocable to the Academic Health Centers

In addition to the annual, recurring impacts of the spending categories outlined above, businesses in the state have invested heavily to support the business volume generated by NEOUCOM and its affiliates. The Tripp Umbach impact model calculates the two principal components of business investments: business real property development and business inventories committed to academic health center-related business.

Ohio businesses have invested a total of \$552.5 million in real property developments to support their business with NEOUCOM. Business inventories in the state allocable to NEOUCOM-related business volume are calculated to be \$462.9 million.

Impact on State Government Revenues

Revenues to the State of Ohio Allocable to NEOUCOM and its Core Teaching Affiliates

A major misconception held by business leaders, elected officials, and the general public, is that medical schools and hospitals don't generate government revenue. While Ohio's academic health centers are not-for-profit institutions the State of Ohio still receives substantial revenues as a result of both the direct and indirect influence of these medical centers. NEOUCOM and its core teaching hospitals are major employers with payroll that provides over \$105.7 million dollars in state income taxes. In addition, the substantial spending with Ohio business generates large-scale revenues for the state in the form of sales tax, corporate net income tax and capital stock/franchise taxes. The Tripp Umbach model calculated the revenue benefits accruing to the state from these sources.

The results of this analysis follow:

Total State Government Revenue

NEOUCOM and its affiliates generated a total of \$105.7 million in revenues for the State of Ohio in 2007. These revenues are comprised of the following:

a. Income taxes paid by NEOUCOM staff, employed physicians, independent contractor physicians and medical residents.

The state income tax payments of personnel employed by NEOUCOM and the independent contractor physicians on the portion of their income attributable to the medical college generate \$44.5 million in revenue for the State of Ohio.

b. Sales tax revenues received by the State of Ohio.

As noted above, the operations of NEOUCOM and affiliated hospitals generate substantial sales for businesses in the state. This spending also generates sales and other consumption tax revenue in the state, which in 2007 equaled \$37.3 million.

c. Corporate Net Income Tax received by the State of Ohio.

The business volume generated by NEOUCOM and its affiliates and their related spending is received as revenue by a broad range of businesses in the state. This revenue, in the case of corporations, generates corporate net income tax receipts for the State of Ohio. During 2007, the business volume attributed to NEOUCOM and core affiliates generated \$8.8 million in corporate net income tax for the State of Ohio.

d. Other selective business taxes received by the State of Ohio.

A number of other taxes apply to various business enterprises around the state, these include: gross receipts tax, public utility realty tax, insurance premiums tax, motor vehicle tax, and the financial institutions tax. The business volume generated by NEOUCOM and the many Ohio businesses it supports generated \$13.4 million in these other selective business taxes during 2007.

Impact on Employment

The Direct and Indirect Expansion of Employment in the State Attributable to NEOUCOM and Core Teaching Affiliates

Perhaps the benefit that comes closest to home is the sheer number of Ohio's citizens who depend on healthcare institutions, either directly or indirectly, for their jobs and livelihoods. A total of 41,126 full time equivalent jobs in the State of Ohio in 2007 were directly or indirectly attributable to NEOUCOM and its core teaching affiliates.

Even on a direct employment basis (i.e., only counting those directly employed at the academic health centers) NEOUCOM and its core teaching affiliates are responsible for a substantial component of statewide employment. During 2007, NEOUCOM and its core affiliates employed a total of 22,848 full-time equivalent persons.

While direct employment is significant, the actual extent of employment impact on the state stemming from the academic health centers is considerably larger. The business volume generated by the academic health centers creates jobs in a broad range of sectors throughout the state's economy. These jobs are proportionate to the service needs of the academic health centers themselves and their related populations (staff, physicians, students, etc.). In addition, the tax revenues generated at the state and local levels by NEOUCOM and its core teaching affiliates and their business volume also create government employment opportunities.

Appendix D: Tripp Umbach

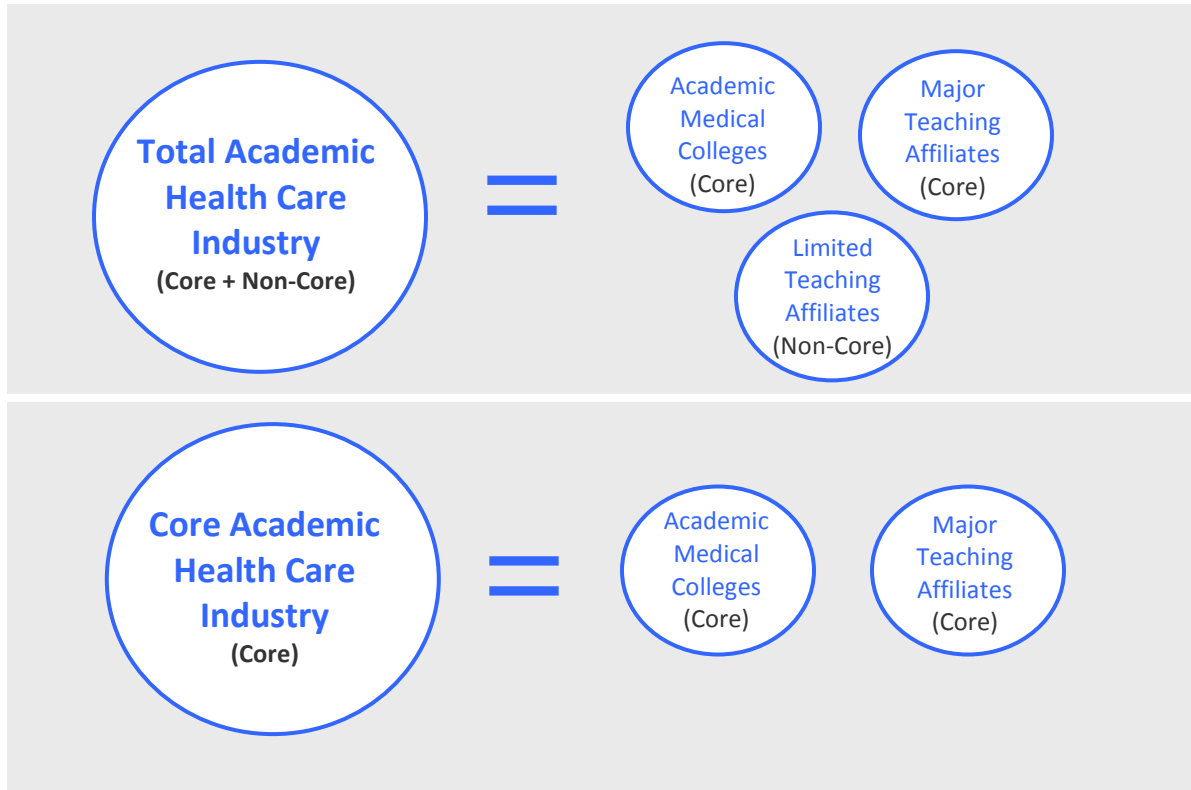
Tripp Umbach is recognized nationally as the leading provider of economic impact analysis for academic health centers, having completed national studies for the Association of American Medical Colleges since 1995. In addition to Ohio, Tripp Umbach has completed statewide economic impact studies for all of the medical colleges and their hospital affiliates in Pennsylvania, Minnesota, Wisconsin, Virginia, Massachusetts, Arizona, and South Carolina. Tripp Umbach has completed economic impact studies for more than 100 leading health care organizations and for several state governmental agencies over the past eighteen years.

Appendix E: Definition of Terms

Total Economic Impact	The total economic impact of an institution includes both the direct economic impact and the indirect economic impact, generated in the economy as a result of the direct impact. Direct impact includes items such as institutional spending, employee spending, and spending by visitors to the institution. Indirect economic impact, also known as the multiplier effect, includes the re-spending of dollars within the local economy.
Total Business Volume	Total sales receipts generated with a given geographic area (State of Ohio). Business volume includes wholesale, retail, service sector spending as well as value added in the manufacturing process.
Multiplier Effect	The multiplier effect is the additional economic impact created as a result of the institution's direct economic impact. Local companies that provide goods and services to an institution increase their purchasing, creating a multiplier.
Direct Tax Payments	Direct tax payments made by an institution to a unit of government.
Indirect Tax Payments	Government revenue that is collected by governmental units in addition to those paid direct by an institution, including taxes paid directly by employees of the institution, visitors to the institution, and vendors who sell products to the institution.
Direct Employment	Total Employees based on Full-Time Equivalents (FTEs)
Indirect Employment	Indirect employment is the additional jobs created as a result of the institution's economic impact. Local companies that provide goods and services to an institution increase their number of employees as purchasing increases, creating an employment multiplier.

Appendix F. Types of Medical School Institution/Affiliation

The Economic Impact of Ohio's Medical Schools and Teaching Hospitals report prepared by Tripp Umbach utilizes two classifications of medical school institution/affiliation when defining the total academic health care industry (**Core & Non-Core**) and the core academic medical center campuses and their major teaching affiliates (**Core**).



The American Medical Association definitions of Major teaching affiliates and Limited teaching affiliates were used by the medical colleges to classify the core and non-core teaching hospitals within their system.

MAJOR affiliation signifies that an institution is an important part of the teaching program of the medical school and is a major unit in the clinical clerkship program and/or is used by the medical school for core aspects of any graduate medical education training program (i.e. residency or fellowship).

For medical student teaching, in general, **major** teaching institutions provide clerkship experience in two or more of the major services, i.e., internal medicine, surgery, pediatrics, obstetrics/gynecology. An institution responsible for most of the teaching in a single specialty, such as psychiatry or pediatrics, may also be considered a major affiliation.

In a major teaching institution medical students serve clinical clerkships regularly, on inpatient services, under the direct supervision of medical school faculty.

For Graduate Medical Education, in general, major teaching institutions meet one or more of the following:

- The housestaff of the training program are selected by officials of a medical school department or by a joint committee of the institution teaching staff and medical school faculty.
- The medical school faculty (other than the institution's attending staff) is regularly scheduled to participate in the graduate teaching programs of the institution.
- A contractual arrangement (with or without financial commitment) specifies the medical school participation in the organization and supervision of the graduate training program in the institution.
- There is some degree of exchange of residents between this institution and the principal teaching institution of the medical school.
- For a major affiliate, it is expected that at least one core residency program assigns each resident to the affiliate for at least 3 months over the span of the residency training program.

LIMITED affiliation signifies that the institution is used in the medical school teaching program only for brief and/or unique rotations of students or residents such as electives.

The medical school teaching program in an institution with **limited** affiliation should be related to curriculum assignments and should be under the supervision of medical school faculty.